LIBRARY
STATE PLANT BOARD

E-496 February 1940

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

THE USE OF DERRIS AND CUBE WASHES IN THE CONTROL OF CATTLE GRUBS

By R. W. Wells, Division of Insects Affecting Man and Animals

INTRODUCTION

Experiments conducted by the Bureau of Entomology and Plant Quarantine, as well as actual ranch practice, have shown that the abundance of cattle grubs (Hypoderma lineatum (DeVill.) and H. bovis Deg.) can be greatly reduced and the annoyance by the adults, or heel flies, very largely eliminated by applications to the backs of infested cattle of a soapy wash containing powdered root of either derris or cube. The wash should be applied before any of the grubs drop from the backs, and the applications should be repeated about once a month during the season when the grubs are present in the backs of the cattle.

HABITS OF THE CATTLE GRUBS[1]

The grubs ("warbles" or "wolves") in the backs of cattle are the young, or larvae, of the heel flies. When the grubs have attained their full growth in the back each grub crawls out of the pocket, or cyst, which it has occupied for 5 weeks or longer and drops to the ground. On the ground it pupates as promptly as climatic conditions will permit, and 4 or 5 weeks later the pupa changes into a heel fly. The female fly goes to the cattle merely to lay her eggs and she lives only a few days. Usually the eggs are laid on the hair around the hoofs, but occasionally they may be laid on hair along the belly and escutcheon. In a very few days the eggs hatch, and the tiny larvae, or grubs, burrow through the skin near the base of the hair upon which the eggs were laid. Having thus effected an entrance, the young grubs pursue a devious course through the body of the animal, reaching the

[1] For more technical and detailed information on the habits of cattle grubs see Farmers' Bulletin No. 1596, "Cattle Grubs or Heel Flies with Suggestions for their Control."

back about 9 months later. Each grub makes a hole in the skin of the back and remains in close contact with the opening, through which it gets air. In this location the grub completes its growth while the tissues of the host form a pocket, or cyst, around it. It is here also, before the grub escapes to the ground, that the stock owner has the best opportunity to destroy it. Being open to the air, the cyst may become contaminated with bacteria. Pus and swellings occur in many cases.

LOSSES AND DAMAGES

The serious losses to the cattle industry are well known (see Farmers' Bulletin No. 1596). In addition to the great damage to the meat and the leather caused by the grubs, the cattle are extremely annoyed by the flies. When the heel fly attempts to lay her eggs the cattle become frantic and rush madly from their feed or rest to the protection of shade, mud, or water. Sometimes the fright is sufficient to cause a stampede. The heavy loss in milk production immediately resulting is well known by dairymen.

MATERIALS USED IN THE WASH

The materials required for making the wash are derris or cube powder, neutral soap, and rain water or other soft water.

The Powders

Powdered root of cube is recommended. Better results have been obtained with cube powder than with derris powder when the rotenone content has been approximately equal. Therefore, unless cube powder is the more expensive, it should be used. The powder should contain not less than 5 percent of rotenone and should be so finely ground that 90 percent will pass through a 200-mesh screen. Rotenone is the principal toxic ingredient in the powders.

Cube containing 5 percent of rotenone can be obtained at about 25 to 40 cents per pound; and derris is usually slightly higher in price. For the convenience of users the following list of manufacturers and dealers in cube and derris powder is given. No claim is made that the list is complete, nor is any guarantee here expressed or implied for the products of the companies listed.

Chipman Chemical Company, Bound Brook, N. J.
W. J. Dennis, 1540 Tenth St., Des Moines, Iowa.
Derris, Incorporated, 79 Wall St., New York, N. Y.
L. W. Dumont & Co., 50 E. 42nd St., New York, N. Y.
Hammond Paint and Chemical Co., Inc., Beacon, N. Y.
McCormick and Co., Baltimore, Md.
R. J. Prentiss and Co., Inc., 100 Gold St., New York, N. Y.
S. B. Penick and Co., 132 Nassau St., New York, N. Y.
Sherwin-Williams Co., Chicago, Ill.

Stanco, Inc., 2 Park Ave., New York, N. Y.
Gilman's Drug Store, 627 Pennsylvania Ave., N. W., Washington, D. C.
Maxwell and Tennyson, 1726, 1801, and 1835 I St., N. W., Washington, D. C.
John Powell & Co., Inc., 114 E. 32nd St., New York, N.Y. (also Dallas, Tex.).
Southwestern Drug Company, Dallas and Fort Worth, Texas.

The Soap

Neutral soap, such as is employed in soft water to wash woolen articles, should be used. It has been found that hard-water soap or home-made lye soap is alkaline and makes the rotenone in the powder less effective. Flaked or granulated soap dissolves in the water more readily than bar soap. Apparently bar soap is just as effective, however, and it can be used where time for dissolving it is available.

The Water

It is important to use soft water. Hard waters contain certain salts that precipitate some of the soap and make the wash less effective. Usually rain water is satisfactory. Where rain water is not available, crystal-softened water, which can be obtained from laundries or from ice-manufacturing plants, may be used.

Quantities of Materials Needed

The powder, soap, and water are mixed in the following proportions:

Water	1 gallon
Cube or derris powder	12 ounces
Soap	2 ounces

One gallon of the wash is sufficient to treat the backs of from 12 to 16 head of adult cattle, depending on how long and how thick the hair is. For example, 1 gallon was sufficient to treat 16 head of cattle in King County, Tex., in January, while in Colorado during the same month 1 gallon was sufficient for only 12 head of cattle with heavier coats. It is essential that enough be applied to saturate the hair and wet the skin.

PREPARATION OF THE WASH

Warm water should be used in order to dissolve the soap rapidly and to aid in good penetration of the hair. To save time, the cube or derris powder should be weighed out in paper bags ahead of time. When a large number of cattle are being treated it has been found expedient to dissolve 24 ounces of soap in 12 quarts of water heated in a large bucket over a wood fire. After the soap has all dissolved, each of the 12 quarts contains 2 ounces of soap. One quart of this soapy concentrate is added to 3 quarts of warm water to make each gallon of wash.

The powder is first dumped from the paper bag into the bottom of a pail, the soap-water mixture is then added slowly while the powder is worked into a smooth paste, and finally the rest of the measured soapy water is added and thoroughly stirred.

METHOD OF APPLICATION

A stiff brush and a dipper or a glass fruit jar with perforated top are needed by each person applying the wash. The brush should be one with stiff fibers. The short-handled type used for scrubbing the under surfaces of automobiles is satisfactory. The fibers are of palmetto and do not soften so readily as do those of the ordinary white-fibered brushes. These brushes may be obtained at about 25 cents each at hardware stores or at stores specializing in automobile accessories.

As often as the brush becomes matted with hair it should be cleaned. This can be done quickly by means of a multiple-pronged ice chipper or a board containing many nails driven at a slant.

A dipper may be used for pouring the wash over the backs of the cattle. The bowl of the dipper should be dented on one side, at about the level of one-half pint, so that the operator can judge about how much wash he has taken.

If the cattle are treated in a chute and the chute is high so that the operator has to climb over the top, a glass jar with a perforated metal top is convenient. Ten or twelve holes are made with a nail in the metal top of a 1-quart fruit jar. The jar is inverted and shaken over the back until about one-fourth of the quart is used.

The wash should be thoroughly stirred in the pail each time a dipper or jar is filled. The stirring can be done with the dipper or with a paddle.

As the wash is poured slowly over the back, the brush is used vigorously to distribute the wash and to rub it deeply into the hair, and also to remove the scabs from the grub holes. Vigorous and continued rubbing is required for best results. Where the coats of the cattle are extremely thick the best results are obtained by laying the brush aside after the wash is distributed over the back and continuing the rubbing for 1 minute with the fingers of both hands. The object is to have the wash reach each warble opening in the skin.

It is wasteful to apply so much of the wash to the back that it runs off, but it is important to apply all that will stay in the hair.

Wire brushes should not be used, since they may injure the skin of the animal.

SCHEDULE FOR APPLYING THE WASH

The wash should be applied before any of the grubs drop from the back. The grubs become almost black before they drop; therefore, when a few of the grubs are found to be of a dark shade the first application of the wash should be made at once.

The cattle grub season varies greatly with the latitude. In King County, Tex., in 1938, the first application of the wash was made about the middle of October. In the southeastern part of Colorado a few grubs have been found ready to drop about December 15; in the central part of Iowa, about February 20; in North Dakota, about March 15. The second and third applications should be made at 30-day intervals. This is important because some grubs continue to arrive at the back and are not affected by the earlier treatments.

It is not considered advisable to treat the cattle on a very cold day unless they are stabled, because it takes the backs an hour or more to dry. The water and the evaporation intensify the cold.

In some localities the county agricultural agents have aided in organizing cooperative efforts among farmers or ranchers, and in such cases more effective control can be expected. On individual ranches in Texas, however, it was found that the abundance of grubs and heel flies was greatly reduced by individual efforts.

COST OF TREATMENT

The cost of the materials is approximately 2 cents per head per treatment. One man can apply the wash to about 30 head of cattle in an hour. Of course the total cost is affected by the time required to round up all animals and to put them through the chute.

UNIVERSITY OF FLORIDA
3 1262 09224 6858